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ANNOUNCEMENT OF FEDERAL FUNDING OPPORTUNITY

EXECUTIVE SUMMARY

Federal Agency Name(s): National Weather Service (NWS), National Oceanic and Atmospheric Administration (NOAA), Department of Commerce

Funding Opportunity Title: Education, Training and Capacity Development for Weather, Water and Climate Forecasting (ETCD)

Announcement Type: Initial

Funding Opportunity Number: NOAA-NWS-NWSPO-2016-2004829

Catalog of Federal Domestic Assistance (CFDA) Number: 11.467, Meteorologic and Hydrologic Modernization Development

Dates: Award Start Date 09/01/2016

Funding Opportunity Description: The ETCD Program's goal is to improve performance of all operational meteorologists and hydrologists worldwide. Improving human performance for enhanced decision support services is done through collaborative training and education. ETCD is accomplished through collaboration between operational hydrologists/meteorologists, scientists and academic staff with expertise across a wide range of environmental, educational and social sciences. These activities engage operational hydrologists/meteorologists, researchers, instructors and students in applied training and simulation exercises which are pivotal to the operational climate, water and weather communities. The goal of improving performance is achieved through a Competency-based education and training program. By meeting the goal of ETCD, forecasts and warnings of environmental hazards will be improved.

Eligible applicants must be academic institutions of higher learning which offer doctoral degrees in atmospheric sciences, or consortia of academic institutions of higher learning which offer doctoral degrees in atmospheric sciences. This restriction is needed because the results of the collaboration are to be incorporated into training and educational processes which ensure academic multidisciplinary peer review.

The total NOAA funding amount available for ETCD is anticipated to be approximately \$4,000,000 to \$6,500,000 per year or a total of \$20,000,000 to \$32,500,000 for the five-year period. There will be appropriation of some funds at the start of the award. NOAA anticipates making one award for the five year period and anticipates providing funds one or more times each year for five years. NOAA has no obligation to provide additional funding in connection with that award in subsequent years. Funding for each subsequent year of a multi-year proposal

is at the discretion of NOAA and is subject to the availability of funds.

FULL ANNOUNCEMENT TEXT

I. Funding Opportunity Description

A. Program Objective

The objective of the Education, Training and Capacity Development (ETCD) Program is to improve forecast and warning capabilities of the weather, water, and climate communities. This improvement is achieved by addressing human performance improvement activities through collaborative efforts between NOAA, the World Meteorological Organization (WMO), other agencies, universities and the weather communities. The primary goal of ETCD is to enhance the performance of its workforce, partners and users. ETCD addresses NOAA's Visions, as stated in NOAA's Next Generation Strategic Plan (<http://www.ppi.noaa.gov/goals>). The Vision includes a Weather Ready Nation in which society is prepared for and responds to weather-related events and for Climate Adaptation and Mitigation in which an informed society anticipates and responds to climate and its impacts.

The ETCD Program supports the goals of the World Meteorological Organization (WMO). WMO provides a framework for international cooperation in the development of meteorology and operational hydrology and their practical application. Under WMO leadership and within the framework of WMO programs, National Meteorological and Hydrological Services (NMHSs) contribute substantially to the protection of life and property against natural disasters, to safeguarding the environment and to enhancing the economic and social well-being of all sectors of society in areas such as food security, water resources and transport.

WMO promotes cooperation in the establishment of networks for making meteorological, climatological, hydrological and geophysical observations, as well as the exchange, processing and standardization of related data, and assists technology transfer, training and research. It also fosters collaboration between the NMHSs of its Members and furthers the application of meteorology to public weather services, agriculture, aviation, shipping, the environment, water issues and the mitigation of the impacts of natural disasters.

WMO facilitates the free and unrestricted exchange of data and information, products and services in real- or near-real time on matters relating to safety and security of society, economic welfare and the protection of the environment. It contributes to policy formulation in these areas at national and international levels. In the specific case of weather-, climate and water-related hazards, which account for nearly 90% of all natural disasters, WMO's programs provide vital information for the advance warnings that save lives and reduce

damage to property and the environment. WMO plays a leading role in international efforts to monitor and protect the environment through its programs.

ETCD supports the forecast process. The forecast process consists of distinct phases: Observations, Analysis, Central Processing, Forecast, and Dissemination/Decision Support. Having a complete and timely set of surface, upper air, ocean, river, etc. observations worldwide is an essential step in the forecast process. Many countries require assistance to develop their capacity in taking observations and transmitting observations through the worldwide telecommunication networks. This capacity development assistance includes the development, acquisition and management of cost-effective observing technologies, hardware and software enhancements, maintenance and repairs, logistics, cost management, technical data verification, and life-cycle replacements of observational platforms. The capacity development also includes forecast models for storm surge, numerical weather prediction and other models.

Specifically, ETCD supports the goals of improved weather decision services for events that threaten lives and livelihoods, and for enhanced climate services to help communities, businesses, and governments understand and adapt to climate related risks. ETCD supports the goals of enabling integrated environmental forecast and decision services supporting healthy communities and ecosystems, and sustaining a highly skilled, professional workforce equipped with the training, tools, and infrastructure.

Providing enhanced decision support services is accomplished through collaborative training and education with the university community, other federal and state agencies, and the Weather, Water, and Climate community. This community supports the Nation's need for job creation, economic growth, sustainable development, and improved living standards for all Americans. ETCD is accomplished by involving operational hydrologists and meteorologists, scientists and academic staff with expertise across a wide range of environmental, educational and social sciences. These activities engage operational hydrologists, meteorologists, researchers, instructors and students in applied training and simulation activities that are pivotal to the operational climate, water and weather communities. ETCD focuses on improving the accuracy, timeliness and utility of forecasts and warnings of environmental hazards by enhancing human performance.

The goals are to maintain an efficient and effective workforce and facilitate the transfer of scientific developments into operations in NOAA and other countries. The vision for the program is to develop and deliver effective education and training in response to workforce needs and human performance improvement goals. The following goals specify how this mission is realized:

GOAL 1: Establish a logical, flexible, and responsive education and training infrastructure to quickly translate training and education competency requirements, learning objectives and performance needs into easily accessible, usable, and effective training.

GOAL 2: Implement an efficient, open, and consistent process for defining and establishing priorities for training and education requirements.

GOAL 3: Establish an easy to use, easy to find resource to clearly specify and monitor training and professional development activities available to operational meteorologists and hydrologists.

GOAL 4: Develop an annual project plan for education and training to ensure responsiveness to the requirements and competency needs.

GOAL 5: Create a process to facilitate rapid response to emerging or changing training priorities within any fiscal year. Identify requirements which cannot be met due to resource limitations.

GOAL 6: Establish an effective, continuous evaluation process to ensure the intended benefits of training and the desired Competencies are achieved.

Several programs are underway to prepare for the shift from producing hydrometeorological products to assisting users and partners in their decision support process. As a result, the demand for training in science and technology to support decision support services is increasing. Without such training, maintaining a highly trained, professional workforce that performs at the required levels to protect life and property will be compromised. Vital training needs and associated Competency assessments are constantly being identified.

An Outreach program whereas a university/academic researcher and their students work collaboratively with an operational weather forecast office or center is an effective learning tool. Sub-awards are encouraged to be submitted especially with regards to local challenging forecast phenomena and new cutting edge theories and applications. Training is an integral part of the Research to Operations transition. These sub-awards could be for one or multiple years to support the local collaborative research but only where a local weather forecast office/center is actively involved.

The need for an expanded training and education performance improvement program is critical for the key Competency areas called "Professional Development Series" (<http://www.nws.noaa.gov/training/pds.php>). Each PDS corresponds to a specific job responsibility and describes/defines what it means to perform competently for that job responsibility. The concept helps operational personnel to focus on what they should be able to do and what Competencies they should be able to achieve. The PDS document combines both scientific and technical understanding with professional skills and techniques. Each PDS series is based on developing a performance competencies and capabilities to support

user products and services.

Each PDS is composed of a series of Professional Competency Units (PCU) which describe specific job duties. The PCU document has several components:

- *Description of the job duty competency to be achieved
- *Description of need for the job duty
- *Specific job duty skills and knowledge
- *Instruction components
- *Evaluation measures

The basic idea behind the PDS concept is that individuals with a specific job responsibility (PDS) can, for each associated job duty (PCU), easily find training resources (instructional components or ICs) to help bring his/her performance of that job duty up to a sufficient level. The delivery methods used for each IC can vary from residence courses to virtual courses/teletraining to web-based instruction or combinations of blended learning. The active PDSs are: Aviation, Climate, Emergency Response Specialist, Fire Weather, Hydrology, Marine, Severe Convection, Tropical and Winter Weather.

Aviation: Provide aviation weather services in support of aviation customer decision-making. This includes coordinating and communicating with aviation system operational partners, continuously assessing and forecasting the aviation weather environment, providing aviation weather information and services, performing outreach to the aviation community and ensuring the quality of aviation meteorological information and services.

Climate: Facilitate operational meteorologist's understanding and application of climate products and services. Operational meteorologists must be able to incorporate and apply new ideas and techniques of dynamic climatology at the local level and be able to communicate climate information and concepts as part of the office outreach program.

Emergency Response Specialist: Build community resilience in the face of increasing vulnerability to extreme weather by providing superior decision support services in all phases of the disaster life cycle. This identifies the professional competencies needed to perform the responsibilities of an Emergency Response Specialist, along with an inventory of instructional components available to build those skill sets.

Fire Weather: Provide operational personnel with an understanding of fire partners and the elements and products which support fire weather. The Fire Weather Forecaster has the role of developing fire weather elements for gridded databases and analyzing these elements along with terrain to determine sub-gridscale influences of terrain. They need to recognize patterns and monitor weather conditions and fuels to detect potential for large fire growth or

erratic behavior. They transfer this information to the fire weather user community through products and Decision Support Services. The content of these products is driven by a comprehension of partner needs. The fire community relies on this information to make strategic and tactical decisions for both Prescribed and Wildfire activity. The personnel work with local agencies and incident management teams to ensure that these services are timely and effective through liaison, training and verification. They ensure office situational awareness is maintained on fuel conditions and fire activity. Support to users can be elevated through deployment of Incident Meteorologists (IMET) who will work onsite. The onsite presence of an IMET comes with an expectation of elevated awareness of fire operations and an ability to rapidly assess terrain impacts on local weather conditions and fire behavior. IMET duty can be arduous and requires continued preparation and training to ensure that effective service can be provided during a spectrum of operational environments.

Hydrology:

- Provide Hydrologic Services: Provide hydrologic and hydrometeorological services, data and information, and river flow/stage forecasts and flood/flash flood warnings to support the decision-making process of internal and external hydrologic customers. Partners and users depend on these products to make decisions related to navigation, water management, floodplain management, ecosystem management, recreation, etc. Those partners and users include federal, state, tribal, and local agencies, private entities, and the general public.
- Develop, Implement, and Maintain Models and Tools: Offices are dependent upon effective and well maintained hydrologic/hydraulic models and tools to support operational services.
- Manage a Hydrology Program: In support of hydrologic forecast and warning operations, managing the Office hydrology program ensures the integrity and relevancy of hydrologic services for partners and users. The Hydrology Program Manager (HPM) provides hydrologic leadership, expertise and outreach for flooding, drought, water supply and other local hydrologic issues. Duties are to build and maintain situational awareness and coordination between hydrology forecast centers and partner agencies as well as maintain the local data program, conduct field work, and configure software. Responsibilities also include training staff to support delivery of hydrologic information during normal and backup operations in addition to gathering and analyzing post event information to improve services.

Marine: Provides forecasters with a baseline standard of knowledge, skills, abilities, and proficiencies. In conjunction with local office requirements, these competencies will allow a marine forecaster to work an operational shift; issuing marine forecasts and warnings and providing valuable decision support services.

Severe Convection: Outlines eight competencies of the forecast process for severe convection and include Optimizing Office Strategies for Convective Operations, Assessing Climatology, Assessing the Synoptic Environment, Analyzing and Assessing the Mesoscale Environment, Analyzing the Structure of Convective Storms, The Warning Decision Process, Composing and Disseminating the Convective Warning Process, and Post-Event Assessment.

Tropical: Provides pertinent tropical weather forecast and warning services to make timely and effective decisions to protect life and property in support of the nation's economic well-being. This includes Fundamentals of tropical weather and tropical forecast operations, Forecasting tropical cyclones, Assessing the threat of associated hazards and recognizing potential impacts, Forecasting extra-tropical transition and potential impact, Effectively communicating the potential impacts from tropical cyclones and Ensuring smooth tropical cyclone operations.

Winter Weather: Identifies the competencies required to execute successful winter weather forecasts, watches, advisories and warnings, and includes available educational and other resources. To get the forecast right requires a team effort where the members know the science behind the meteorology of winter weather, applies modern methods to create an impact-based forecast, and effectively communicates with its users.

NOAA supports the education, training and capacity development efforts to create a WMO Global Campus. WMO stated that the work should be carried out via collaboration with national and international partners and special emphasis should be placed on promoting and supporting the exchange and sharing of training resources and expertise, including e-learning. WMO supports the proposal for a consortium of Regional Training Centers (RTC), NMHSs and other institutions to develop an accredited online course that would meet the Basic Instruction Package for Meteorology requirements. The purpose of the WMO Global Campus is to provide a framework or mechanism for the many WMO affiliated institutions (particularly RTCs) involved in providing education and training support to Members to learn from each other, coordinate courses and training resources and collaborate to develop and deliver courses in multiple languages for Members. The first steps will be the development of three demonstration activities: a searchable online calendar that brought together in one website as many as possible education and training activities offered by WMO RTCs and WMO affiliated institutions to assist Members in identifying education and training opportunities for the staff of their NMHSs; further development and delivery of teaching and learning resources that would result in a course or courses supporting aeronautical meteorological personnel competencies in multiple languages suitable for face-to-face and/or online delivery; and, commence the development of a course or courses

supporting climate services in multiple languages suitable for face-to-face and/or online delivery. The climate services course or courses, initially focusing on climate and adaptation issues would build upon the lessons learned from the existing collaborative developments, further enhancement of the aeronautical meteorological course(s) and outcomes regarding competencies for personnel involved in the provision of climate services. Translation of education and training materials into multiple languages enhances the adoption of competency frameworks and assessments.

Capacity Development in support of the WMO Observing requirement includes a host of activities to facilitate the observational, dissemination and forecast capabilities of developing nations. These include:

- RANET (Radio and Internet for the Communication of Hydro-Meteorological and Climate Related Information): Climate and weather play a vital role in many human activities such as agriculture, energy production, wildlife management, disaster mitigation, health and a host of other areas. Technological and scientific advances in recent decades have produced a variety of products that can help humans manage systems sensitive to meteorological events and seasonal variability. Unfortunately, rural and technologically disadvantaged populations often those most in need of this information do not always possess the means or training with which to access meteorological products already produced by national, regional and various international organizations and government agencies.
- Training Workshops on Climate Variability and Prediction: Goal is to increase the capacity of developing countries in climate monitoring and predictions to enhance climate services.
- Flash Flood Guidance Systems: Installs modern river flood forecasting systems to regionalize capabilities by applying it to key rivers/streams. Improved rainfall monitoring leads to enhanced landslide predictions during extreme precipitation events.
- International Extension and Public Alert Systems (IEPAS): Uses small scale and low cost fabrication technologies to help NMHSs develop and maintain basic equipment such as weather stations. By manufacturing and assembling unique components, the cost of the devices is often reduced, repair is simplified and quicker, the network is deployed in a manner consistent with local capabilities and NMHSs have more control.
- River flood forecasting modernization and upgrading of storm surge models to assist the WMO Weather Ready Nations initiative to build WRN capability in developing countries.

Competencies for operationally utilizing satellite remote sensing are urgently needed worldwide for the new satellites being launched and operated. Training is needed about Polar Orbiting Environment Satellites (POES) and Geostationary Earth Orbiting Satellites (GOES), for use by federal agencies, universities, and international organizations (WMO). The POES and GOES training materials and information pieces serve a valuable function by preparing the world for a new era of geostationary and polar orbiting satellites. Current and future users, such as emergency managers, coastal managers, private sector, state and local land managers, and transportation industry, will benefit when these new satellites are launched. Environmental Satellite training needs to focus on the integration of GOES (Himawari for Japan) and POES data into operational applications by including examples and training in relevant learning resources. Environmental Satellite training needs to provide updates and revisions to previously released materials when new satellite products and capabilities become available to operational meteorologists and hydrologists.

B. Program Priorities

NOAA will give sole attention to proposals addressing the identified priorities as listed below. Proposals must clearly specify which primary priorities are addressed. The proposal must address the major science and human performance areas listed under the following sections. The proposal must also clearly articulate the Instructional Design or Implementation Methodologies proposed. Principal investigators (PIs) must clearly address the evaluation and quality assurance processes within their proposal.

The top ETCD priorities for Education and Training which are ongoing and planned for the next five years are as follows:

- Improved region-specific conceptual models for tornado, hail, high wind (both convective and synoptic), flash flood, and localized heavy snow events is required. Include roles of mesoscale phenomenon such as waves, thermal and moisture boundaries, and localized instabilities during these events.
- Improved understanding of cloud physics and associated microphysical processes associated with fog, ceilings, clouds bases, cloud tops, snow and mixed precipitation, and surface visibility, and associated advanced techniques for forecasting these phenomena.
- Improved forecasts and warnings of severe weather and heavy precipitation during tropical cyclone events.
- Improved forecasting of high resolution aviation fields such as ceiling, visibility, and winds, IFR flying conditions and low level wind shear.
- Improved understanding and modeling of snow melt and river ice formation and break-up processes.
- Improved forecasts and warnings of storm surge and flooding during tropical cyclone

and extratropical storm events, including geospatial depictions of inundation and landslide predictions.

- Improved hydrologic modeling and prediction for rivers and streams, including calibration of models, improved distributive modeling techniques, and improved soil moisture accounting.
- Improved methods for forecasting high impact weather events through the use and development of high resolution rapid refresh numerical models, and the application of model ensemble techniques in the forecast process.
- Improved methods for communicating weather and water information to the public and decision makers which incorporates forecast uncertainty.
- Improved winter weather forecasting included mixed precipitation, timing of onset of events and impacts to users for decision support.
- Improved hydrological modeling, through use of emerging techniques, such as distributed hydrologic modeling, ensemble and probabilistic forecasts, dynamic and static flood inundation mapping, and rain/snow melt processes in complex terrain.
- Improved use of GOES & Himawari multi-spectral channels and derived products in specific forecast applications.
- Improved methods of communicating water, weather and climate information to public and decision makers, particularly for high impact events.
- Improved communication of uncertainty and risk associated with hazardous mesoscale weather for partners and decision makers.
- Improved high-latitude arctic forecasts and sea ice forecasting.
- Improved seasonal to interannual climate information for public and private decision makers.
- Improved dispersion forecasts for smoke, volcanic ash, and radioactive sources.
- Improved forecasts for tsunami wave onset, height, timing, and impacts.
- Improved use of POES satellite data for forecast application especially with the Day-Night Band and NUCAPS soundings.
- Improved translation efforts of many training materials, with translation of materials into Spanish and French.
- Improved NWP training to include new high resolution rapid refresh models, short range ensemble models, model blends, coupled ocean-atmosphere models, and climate models.

Specific High-Priority Capacity Development Support Required:

- Support the World Meteorological Organization (WMO) efforts to implement the Competency based assessments worldwide.
- Support WMO for Global Campus activities and support the feasibility studies.
- Support for RANET to improve communications of meteorological/hydrological

observations, forecasts and warnings

- Support Capacity Development in taking meteorological and hydrological observations in developing countries.
- Support Capacity Development in developing countries to enhance climate services monitoring and prediction.
- Support Capacity Development for improved rainfall monitoring and prediction systems to enhance flood, flash flood and landslide predictions.
- Support IEPAS to help developing countries fabricate low-cost weather stations and equipment.

Distribution and User Access of Education and Training Materials: Several critical functions are needed for the ETCD infrastructure to provide the necessary services. One of the primary requirements is for a robust, user friendly and continuously updated ETCD Website. The Website and underlying infrastructure must support the following:

- Demonstrated capacity to support one million registered users
- Demonstrated capacity to support 5,000 users simultaneously taking training modules each day
- Robust, reliable and secure registration and tracking system
- 24 hour by 7 day support (automated online and human)
- System available and accessible at a minimum of 99% uptime
- Data storage and data access for case studies and simulations
- Real-Time data feed, storage and distribution which includes all NOAA operational NWP, satellite and radar data

Instructional Design Process and Training Requirements:

The proposal must clearly articulate the Instructional Design methodology proposed and how this methodology will be utilized to maximize student retention and performance improvement to meet Competency Assessments. Principal investigators (PIs) must clearly address the evaluation and quality assurance processes within their proposal. The following areas need to be addressed:

- Sound instructional approach – provide approach that includes clear design, needs assessment, analysis, performance objectives and rapid development – with a focus on effective distance learning/training and on collaborative simulations.
- Simulations: Develop, maintain and update comprehensive training, education and simulation system with the infrastructure to support a wide range of users across many disciplines.
- Searchable catalog of instructional objects for seasonal readiness training.
- Incorporate Social Media and mobile device access to training materials and modules.
- Use of outside Subject Matter Experts throughout development process to ensure latest

cutting-edge science and technology are incorporated into training and simulations

- Synchronous and asynchronous delivery of material via web training, simulations and teletraining through blended learning.
- Manage an extensive searchable library of training materials organized into cohesive topics with evaluations and assessments and the ability to provide customized learning paths for various disciplines and users.
- Utilize and develop enhanced environmental simulations in support of a wide variety of climate, water and weather scenarios and services.
- Utilize high quality animations, digital video/audio, and other innovative technologies.
- Develop and maintain training materials in a manner that allows for ready access and use by a broad and growing user community both domestic and international.
- Provide assessment with levels of evaluation capability and a reporting system to provide metrics.
- Provide for seamless transfer of student completion records to the Commerce Learning Center (CLC) Learning Management System which supports over 50,000 users.
- Develop and maintain a registration/tracking system that is robust, reliable, and verifiable and which can expand to include a growing worldwide community of over one million users.

Outreach Sub-Awards:

An Outreach Program's goal is to improve local forecast and warning services by providing financial support for applied mesoscale and synoptic-scale research. Need to create partnerships between the academic research community and operational hydrometeorologists that allow the exchange of ideas to the benefit of both groups. This activity needs to be with PIs in the academic and operational communities collaborating on the joint proposal. The proposals usually address a local or regional hydrometeorological forecast problem. Activities are done using a competitive request for proposal process that includes some limited NOAA participation in the review.

C. Program Authority

NOAA's authority to support the research and associated activities anticipated by this FFO is contained in one or more of the following:

- 15 U.S.C. § 313, the Weather Service Organic Act;
- 49 U.S.C. § 44720, which authorizes NOAA, inter alia, to maintain agreements and support research projects in meteorology through the use of private and Governmental research facilities; and
- 33 U.S.C. § 893a, the provision of the America COMPETES Act which authorizes NOAA to conduct, develop, support, promote, and coordinate formal and informal educational activities at all levels to enhance public awareness and understanding.

II. Award Information

A. Funding Availability

The total NOAA funding amount available for ETCD is anticipated to be approximately \$4,000,000 to \$6,500,000 per year or a total of \$20,000,000 to \$32,500,000 for the five-year period. There will be appropriation of some funds at the start of the award. NOAA anticipates making one award for the five year period and anticipates providing funds one or more times each year for the five years. NOAA has no obligation to provide additional funding in connection with that award in subsequent years. Funding for each subsequent year of a multi-year proposal is at the discretion of NOAA and is subject to the availability of funds.

B. Project/Award Period

This program announcement is for projects to be conducted by collaborative program of investigators for a five-year period, with an anticipated start date of September 1, 2016 unless otherwise directed. When a proposal for a multi-year award is approved, funding will initially be provided for only the first year of the program. It will be contingent upon satisfactory progress in relation to the stated goals of the proposal to address specific science needs and training priorities. Applications must include a scope of work and a budget for the entire award period.

C. Type of Funding Instrument

The funding instrument for extramural awards will be a cooperative agreement since one or more NOAA components will be substantially involved in implementation of the project. Examples of substantial involvement may include, but are not limited to, proposals for collaboration between NOAA scientists and the recipient and assistance with reviews of outreach proposals. NOAA believes its warning and forecast mission will benefit

significantly from enhancing the performance of its workforce through a strong partnership with outside investigators in the academic community. Current program plans assume the total resources provided through this announcement will support extramural efforts through the broad academic community.

III. Eligibility Information

A. Eligible Applicants

Eligible applicants must be academic institutions of higher learning which offer doctoral degrees in atmospheric sciences, or consortia of academic institutions of higher learning which offer doctoral degrees in atmospheric sciences. This restriction is needed because the results of the collaboration are to be incorporated into training and educational processes which ensure academic multidisciplinary peer review.

B. Cost Sharing or Matching Requirement

No cost sharing is required under this program.

C. Other Criteria that Affect Eligibility

Since a goal of this announcement is to foster long-term collaborative interactions between a university consortia and operational hydrometeorological offices and service centers, a university consortia would need to select one PI for the proposal. Collaboration between the academic community and the government within the project is highly encouraged. In addition, collaboration with PIs at different universities or university consortia is permitted. The PI must have experience as a university professor or those with comparable qualifications with substantial documented involvement in the proposal.

Proposals should clearly state the role of the PI in the project. Except for researchers who are associate, assistant, or full professors at the Naval Postgraduate School, federal government employees are not allowed to be listed as PIs or receive funding.

IV. Application and Submission Information

A. Address to Request Application Package

The standard application package is available at <http://www.grants.gov>. An application package may also be requested by contacting Leroy Spayd, Portfolio Coordinator, Office of the Chief Learning Officer, NOAA/NWS, 1325 East-West Highway, Room 14222, Silver Spring, Maryland 20910, Phone: 301-427-9322, email: leroy.spayd@noaa.gov.

B. Content and Form of Application

Proposals should total no more than 50 pages in length, single spaced. The proposal should use Times New Roman 12 point font. Federally mandated forms, tables of content, PI and staff vitae, budget tables and any letters of support are not included within the page count.

Multi-year proposals up to a maximum of five years will be considered; however, funding beyond the first year will be dependent upon satisfactory performance and the availability of funds. September 1, 2016 is to be used as the proposed start date on proposals unless otherwise directed by the NOAA Program Officer.

The application elements listed below are required before an award can be made. Failure to submit elements 1, 4, and 5 by the deadline will result in the application not being reviewed if the omissions are not corrected prior to the deadline. The program office will make an effort to notify the applicant of any omissions, but there is no guarantee this can occur prior to the application deadline. The aforementioned application elements are as follows:

1. Title Page. The title page must be officially authorized by the institutional representative. The PI and institutional representative should be identified by full name, title, organization, telephone number, and address. It is requested that the title page clearly indicate which project areas are being addressed and the total amount of requested Federal funds be listed for each budget period.

2 Abstract Page. An abstract should be included and should contain an introduction of the problem, rationale, and a brief summary of work to be completed. The abstract should appear on a separate page, headed with the proposal title, institution's investigators, total proposed cost, and budget period.

3. Results from Prior Training and/or Research. The results of relevant projects should be described, including their relation to the currently proposed work. Reference to each prior award should include the title, agency, award number, PIs, period of award, and total award. The section should be a brief summary and should not exceed five pages total.

4. Project description. The proposed project must be completely described, including identification of the problem; scientific and training objectives; proposed methodology; relevance to the priorities of operational hydrometeorology; operational applicability; scientific merit; proposed technology transfer; past collaborations with operational hydrometeorologists; cost effectiveness of training materials and approaches; and the

program priorities listed above. Benefits of the proposed project to the general public and the broader scientific and educational community must be discussed. A year-by-year summary of proposed work must be included. Technical description of the infrastructure proposed for user access of the education and training materials must be provided. Specific plans for Capacity Development in support of WMO Objectives must be provided.

5. Budget and Proposed Budget Justification. Applicants must submit a Standard Form (SF) 424, Application for Federal Assistance, including a detailed budget using the SF 424A, Budget Information--Non-Construction Programs. (The forms are available on grants.gov.) Applicants should pay careful attention to show the yearly budget breakout on the SF 424A for multi-year proposals. In addition, the body of the proposal should include a separate table showing total and annual budgets (if multi-year) corresponding with the project description. Additional text to justify expenses should be included as necessary.

6. Vitae. Abbreviated curriculum vitae are sought with each proposal. Reference lists should be limited to all publications in the last five years with up to five other relevant papers.

7. Current and Pending Support. For each investigator, submit a list which includes project title, supporting agency with grant number, investigator months, dollar value, and duration. Requested values should be listed for pending support.

8. National Environmental Policy Act (NEPA) Questionnaire: The Office of Oceanic and Atmospheric Research has determined that applicants do not need to provide answers to the NEPA Questionnaire at this time.

C. Unique entity identifier and System for Award Management (SAM)

NOAA-NWS-NWSPO-2016-2004829

D. Submission Dates and Times

The deadline for receipt of proposals is 5:00 p.m. EDT on May 20, 2016. For proposals submitted through grants.gov, a date and time receipt indication is included and will be the basis of determining timeliness. Grants.gov requires applicants to register with the system prior to submitting an application. This registration process can take several weeks and involves multiple steps. In order to allow sufficient time for this process, you should register as soon as you decide you intend to apply, even if you are not yet ready to submit your application. Hard copy proposals will be date and time stamped when they are received in the program office. Proposals received after the deadline will be rejected or returned to the sender without further consideration.

E. Intergovernmental Review

Applications under this program are not subject to Executive Order 12372, Intergovernmental Review of Federal Programs.

F. Funding Restrictions

Funding beyond the first year will be dependent upon satisfactory performance and the continued availability of funds.

G. Other Submission Requirements

Applications are to be submitted to Grants.gov. For those organizations without internet access, hard copy applications may be sent to: LeRoy Spayd, Portfolio Coordinator, Office of the Chief Learning Officer, NOAA/NWS, SSMC2, Room 14222, 1325 East-West Highway, Silver Spring, MD 20910-3283.

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V. Application Review Information

A. Evaluation Criteria

The evaluation criteria and weighting of the criteria are as follows:

1. Importance/Relevance and Applicability of Proposal (30 percent): This criterion ascertains whether there is intrinsic value in the proposed work and/or relevance to federal, regional, state, or local activities. For ETCD competition this includes:

- What is the historical track record of the applicant in collaborative outreach between the operational and research communities?
- What is the likelihood of the proposed science training and education activities to improve performance in support of operational hydrometeorological services?
- Are Capacity Developments projects in line with past practices used successfully in developing countries?
- What is the degree of collaboration with multiple participating organizations throughout the project?
- What is the level of planning to integrate sound instructional design concepts into complex scientific material for use by a broad user community successfully and efficiently?

2. Technical/Scientific Merit (25 percent): This criterion assesses whether the approach is

technically sound and/or innovative, if the methods are appropriate, and whether there are clear project goals and objectives. For the ETCD competition this includes:

- What is the intrinsic scientific value and maturity of the training subject matter as they relate to specific Competency assessments for professional development series?
- Were focused human performance improvement objectives and strategies, including instructional design, needs assessment, and formulative evaluations used?
- Are the proposed Capacity Developments in line with the technical/scientific capabilities of the country?

3. Overall Qualification of Applicants (25 percent): This criterion ascertains whether the applicant possesses the necessary education, experience, training, facilities, and administrative resources to accomplish the project. For the ETCD competition this includes:

- Do PIs clearly document past scientific and instructional collaborations and Capacity Development with operational hydrologists, meteorologists and other environmental scientists and managers?
- Have past interactions been successful?
- Are instructors and scientists likely to maintain effective and consistent interactions with operational hydrometeorologists and other scientists throughout the course of the proposed ETCD program?
- Have instructors and scientists demonstrated the ability to conduct successful training and education of large numbers of students synchronously, and asynchronously, through virtual and simulation approaches?

4. Project Costs (20 percent): This criterion evaluates the budget to determine if it is realistic and commensurate with the project needs and time-frame. For the competition this includes:

- Do instructors and scientists demonstrate the ability to utilize their resources in a cost efficient manner?
- Is there a high ratio of operationally useful results versus proposed costs?
- Are proposed approaches cost effective in various budgetary scenarios?
- Are proposed Capacity Development solutions the most-cost effective method of improving the observational and dissemination capabilities of the country given the countries technological advancement level?

B. Review and Selection Process

An initial administrative review/screening is conducted to determine compliance with requirements/completeness. All proposals will be evaluated and individually ranked in accordance with the assigned weights of the above evaluation criteria by an independent peer

panel review. Three to five NOAA experts may be used in this process. The merit reviewers' ratings are used to produce a rank order of the proposals. The Selection Official selects proposals after considering the peer panel reviews and selection factors listed below. In making the final selections, the Selecting Official will award in rank order unless the proposal is justified to be selected out of rank order based upon one or more of the selection factors.

C. Selection Factors

The Merit review ratings shall provide a rank order to the Selecting Official for final funding recommendations. The Selecting Official shall award in the rank order unless the proposal is justified to be selected out of rank order based upon one or more of the following factors:

1. Availability of funding
2. Balance and distribution of funds
 - a. By research area
 - b. By project type
 - c. By type of institutions
 - d. By type of partners
 - e. Geographically
3. Duplication of other projects funded or considered for funding by NOAA/federal agencies.
4. Program priorities and policy factors.
5. Applicant's prior award performance.
6. Partnerships with/Participation of targeted groups.
7. Adequacy of information necessary for NOAA staff to make a National Environmental Policy Act (NEPA) determination and draft necessary documentation before recommendations for funding are made to the NOAA Grants Officer.

D. Anticipated Announcement and Award Dates

Subject to the availability of funds, review of proposals will occur during May 2016, and funding should begin during September of 2016. September 1, 2016, should be used as the proposed start date on proposals, unless otherwise directed by the Program Officer.

VI. Award Administration Information

A. Award Notices

The successful applicant will receive notification that the application has been recommended for funding to the NOAA Grants Management Division. This notification is

not an authorization to begin performance of the project. Official notification of funding from the NOAA grants Officer is the authorization that allows the project to begin. Notification will be issued to the Authorizing Official and the PI of the project either electronically or in hard copy. Unsuccessful applicants will be notified that their proposals were not selected for recommendation.

To enable the use of a universal identifier and to enhance the quality of information available to the public as required by the Federal Funding Accountability and Transparency Act of 2006, to the extent applicable, any proposal awarded in response to this announcement will be required to use the Central Contractor Registration and Dun and Bradstreet Universal Numbering System and be subject to reporting requirements, as identified in OMB guidance published at 2 CFR Parts 25, 170 (2010),

http://ecfr.gpoaccess.gov/cgi/t/text/textidx?c=ecfr&tpl=/ecfrbrowse/Title02/2cfr25_main_02.tpl ,

http://ecfr.gpoaccess.gov/cgi/t/text/textidx?c=ecfr&tpl=/ecfrbrowse/Title02/2cfr170_main_02.tpl .

B. Administrative and National Policy Requirements

1. The Department of Commerce Pre-Award Notification Requirements for Grants and Cooperative Agreements. Administrative and national policy requirements for all Department of Commerce awards are contained in the Department of Commerce Pre-Award Notification Requirements for Grants and Cooperative Agreements published in the Federal Register on December 30, 2014 (79 FR 78390). You may obtain a copy of this notice by contacting the agency contact, or by going to the website at <http://www.gpoaccess.gov/fr/index.html>.

2. Unpaid or delinquent tax liability. In accordance with current Federal appropriations law, NOAA will provide a successful corporate applicant a form to be completed by its authorized representatives certifying that the corporation has no Federally-assessed unpaid or delinquent tax liability or recent felony criminal convictions under any Federal law. If a form is provided, an award may not be issued until it is returned and accepted by NOAA."

3. Data Sharing Plan. Environmental data and information, collected and/or created under NOAA grants/cooperative agreements must be made visible, accessible, and independently understandable to general users, free of charge or at minimal cost, in a timely manner (typically no later than two (2) years after the data are collected or created), except where limited by law, regulation, policy or by security requirements."

Unless otherwise noted in this federal funding announcement, a Data/Information Sharing Plan of no more than two pages shall be required as part of the Project Narrative. A typical

plan may include the types of environmental data and information to be created during the course of the project; the tentative date by which data will be shared; the standards to be used for data/metadata format and content; policies addressing data stewardship and preservation; procedures for providing access, data, and security; and prior experience in publishing such data. The Data/Information Sharing Plan will be reviewed as part of the NOAA Standard Evaluation Criteria, Item 1 -- Importance and/or Relevance and Applicability of Proposed Project to the Mission Goals.

The Data/Information Sharing Plan (and any subsequent revisions or updates) will be made publicly available at time of award and, thereafter, will be posted with the published data. Failing to share environmental data and information in accordance with the submitted Data/Information Sharing Plan may lead to disallowed costs and be considered by NOAA when making future award decisions.

4. Limitation of Liability. In no event will NOAA or the Department of Commerce be responsible for application preparation costs. Publication of this announcement does not oblige NOAA to award any specific project or to obligate any available funds.

5. National Environmental Policy Act (NEPA). NOAA must analyze the potential environmental impacts, as required by the National Environmental Policy Act (NEPA), for applicant projects or proposals which are seeking NOAA federal funding opportunities. Detailed information on NOAA compliance with NEPA can be found at the following NOAA NEPA website: <http://www.nepa.noaa.gov/>, including our NOAA Administrative Order 216-6 for NEPA, <http://www.osec.doc.gov/bmi/daos/216-6.htm>, and the Council on Environmental Quality implementation regulations, http://ceq.eh.doe.gov/nepa/regs/ceq/toc_ceq.htm. Consequently, as part of an applicant's package, and under their description of their program activities, applicants are required to provide detailed information on the activities to be conducted, locations, sites, species and habitat to be affected, possible construction activities, and any environmental concerns that may exist (e.g., the use and disposal of hazardous or toxic chemicals, introduction of non-indigenous species, impacts to endangered and threatened species, aquaculture projects, and impacts to coral reef systems). In addition to providing specific information that will serve as the basis for any required impact analyses, applicants may also be requested to assist NOAA in drafting of an environmental assessment, if NOAA determines an assessment is required. Applicants will also be required to cooperate with NOAA in identifying feasible measures to reduce or avoid any identified adverse environmental impacts of their proposal. The failure to do so shall be grounds for not selecting an application. In some cases if additional information is required after an application is selected, funds can be withheld by the Grants Officer under a special award condition requiring the recipient to submit additional environmental compliance information sufficient to enable NOAA to make an assessment on

any impacts that a project may have on the environment.

6. Executive Order 12906: The recipients must comply with Executive Order 12906 regarding any and all geospatial data collected or produced under grants or cooperative agreements. This includes documenting all geospatial data in accordance with the Federal Geographic Data Committee Content Standard for digital geospatial data.

C. Reporting

Award recipients will be required to submit financial and performance (technical) reports. These reports are to be submitted electronically through the NOAA Grants Online system on a semi-annual. All financial reports are routed directly to the NOAA Grants Officer. Performance reports are routed to the NOAA Federal Program Officer.

The first technical progress report covering the first 9 months of a multi-year award is due 10 months after the start date of the award. Each subsequent technical progress report covering a period of 12 months is due 12 months after the previous report. The comprehensive final technical progress report is due 90 days after the expiration date of the award.

The Federal Funding Accountability and Transparency Act of 2006 includes a requirement for awardees of applicable Federal grants to report information about first-tier subawards and executive compensation under Federal assistance awards issued in FY 2011 or later. All awardees of applicable grants and cooperative agreements are required to report to the Federal Subaward Reporting System (FSRS) available at www.FSRS.gov on all subawards over \$25,000.

D. FOIA

In the event that an application contains information or data that you do not want disclosed prior to award for purposes other than the evaluation of the application, you should mark each page containing such information or data with the words "Privileged, Confidential, Commercial, or Financial Information - Limited Use" at the top of the page to assist NOAA in making disclosure determinations. DOC regulations implementing the Freedom of Information Act (FOIA) are found at 5 U.S.C 552, which sets forth rules for DOC to make requested materials, information, and records publicly available under FOIA. The contents of funded applications may be subject to requests for release under the FOIA. Based on the information provided by you, the confidentiality of the content of funded applications will be maintained to the maximum extent permitted by law.

E. If an applicant has not previously established an indirect cost rate with a Federal agency they may choose to negotiate a rate with the Department of Commerce or use the de minimis indirect cost rate of 10% of MTDC (as allowable under 2 C.F.R. §200.414). The negotiation and approval of a rate is subject to the procedures required by NOAA and the Department of Commerce Standard Terms and Conditions Section B.06. The

NOAA contact for indirect or facilities and administrative costs is:

Lamar Revis, Grants Officer
NOAA Grants Management Division
1325 East West Highway
9th Floor
Silver Spring, Maryland 20910
lamar.revis@noaa.gov

VII. Agency Contacts

The point of contact is LeRoy Spayd, Portfolio Coordinator, Office of the Chief Learning Officer, NOAA/NWS, 1325 East-West Highway, Room 14222; Silver Spring, Maryland 20910-3283, or by phone at 301-427-9322 or via email at leroy.Spayd@noaa.gov.

VIII. Other Information

To use grants.gov, applicants must have a Dun and Bradstreet Data Universal Numbering System (DUNS) number and be registered in the Central Contractor Registry (CCR). Allow a minimum of five days to complete the CCR registration. [Note: Your organization's Employer Identification Number (EIN) will be needed on the application form.] Applicants are strongly encouraged not to wait until the application deadline date to begin the application process through grants.gov.